1. A flywheel energy storage system, comprising:

an energy storage flywheel supported for rotation about a substantially vertical axis on a combination bearing system using a mechanical rolling element and a first magnetic bearing;

a motor and generator for accelerating and decelerating said flywheel for storing and retrieving energy;

said mechanical rolling element bearing is located at only one axial end of said flywheel and provides axial and radial support for said flywheel;

said magnetic bearing is located at an axial end of said flywheel opposite said one end thereof, and provides axial magnetic force and passive magnetic radial centering force to support said flywheel;

said flywheel is connected to said mechanical rolling element bearing using a connecting element that imparts low radial stiffness.

2. A flywheel energy storage system as described in claim 1, wherein:

said connecting element is a quill shaft.

3. A flywheel energy storage system as described in claim 1, wherein:

said connecting element is a radial spring located radially disposed between said flywheel and said mechanical rolling element bearing.

4. A flywheel energy storage system as described in claim 1, further comprising:

a second magnetic bearing located at said one axial end of said flywheel, said second passive radial magnetic bearing providing axial and radial support of said flywheel.

5. A flywheel energy storage system as described in claim 4, wherein:

said first magnetic bearing and said second magnetic bearing provide stabile radial support, stabile tilt support and unstable axial support of said flywheel.

6. A flywheel energy storage system as described in claim 5, wherein:

said connecting element imparts a radial stiffness that is less the radial stiffness of said second magnetic bearing.

7. A flywheel energy storage system as described in claim 6, wherein:
said connecting element is a quill shaft.

8. A flywheel energy storage system as described in claim 6, wherein:
said connecting element is a radial spring radially disposed between said flywheel and said mechanical rolling element bearing.

9. A flywheel energy storage system as described in claim 1, wherein:
said flywheel is constructed primarily of steel.

10. A flywheel energy storage system as described in claim 1, wherein:
said low radial stiffness imparted from said connecting element is less than 7000 lbs/in.

11. A flywheel energy storage system as described in claim 10, wherein:
said mechanical rolling element bearing includes at least one ball bearing set.

12. A flywheel energy storage system as described in claim 10, wherein:
said ball bearing set is a multiple preloaded angular contact bearing set.

13. A flywheel energy storage system as described in claim 10, wherein:
said mechanical rolling element bearing is comprised of multiple ball bearing sets connected mechanically in series.

14. A flywheel energy storage system as described in claim 10, wherein:
said mechanical rolling element bearing is comprised of multiple ball bearing sets connected mechanically in parallel.

15. A flywheel energy storage system as described in claim 1, wherein:

said rolling element mechanical bearing provides a downward axial force to support said flywheel in normal operation and said magnetic bearing provides an upward force to said flywheel that is greater than the weight of said flywheel, said flywheel is substantially mechanically free to slide downward with respect to said mechanical rolling element bearing.

16. A flywheel energy storage system, comprising:

an energy storage flywheel supported for rotation about a substantially vertical axis on a combination bearing system using a mechanical rolling element and upper and lower magnetic bearings;

a motor and generator for accelerating and decelerating said flywheel for storing and retrieving energy;

said upper and lower magnetic bearings cooperate to provide stabile radial centering support, stabile tilt support and unstable axial support of said flywheel; and

said mechanical rolling element bearing is located at one axial end of said flywheel and provides axial stabilization for said flywheel.

17. A process of storing and recovering energy in a flywheel energy storage system, comprising:

accelerating a flywheel in rotation about a substantially vertical axis inside a container with a brushless motor, for storing energy in the form of rotational inertia of said flywheel;

decelerating said flywheel with said generator for retrieving said stored energy in the form of electrical energy;

supporting a flywheel at one axial end of said flywheel with a passive radial magnetic bearing that provides both radial and axial support; and

axially and radially stabilizing said flywheel at an opposite axial end from said one end with a mechanical rolling element bearing that is connected to said flywheel through use of a connecting element that imparts a low radial stiffness.

18. A process as described in claim 17, wherein:

said connecting element is a quill shaft.

19. A flywheel energy storage system, comprising:

an energy storage flywheel supported for rotation about a substantially vertical axis on a combination bearing system comprised of a mechanical and a magnetic bearing;

a motor and generator for accelerating and decelerating said flywheel for storing and retrieving energy;

said mechanical bearing is located at one axial end of said flywheel and provides axial downward force to said flywheel;

said magnetic bearing is located at an axial end of said flywheel opposite said one end and provides axial upward force and passive magnetic radial centering force to said flywheel;

said axial upward force from said magnetic bearing is greater than the weight of said flywheel;

said flywheel slides axially downward and disengages axial support from said mechanical bearing when said flywheel system is impacted vertically.

20. A flywheel energy storage system as described in claim 19, wherein:

said mechanical bearing is a rolling element mechanical bearing and said flywheel is connected to said mechanical rolling element bearing using a connecting element that imparts low radial stiffness.